Edwards Air Force Base
Environmental Restoration Program

Site 285 Update

December 2003

The selective ion exchange technology at Site 285 began treating perchlorate-contaminated groundwater at the site in May 2003. Since then, more than 4 million gallons of water have passed through the system, which reduces perchlorate to nondetectable levels.

Background of perchlorate at Edwards

The Air Force spent years in solid-fuel propellant development and rocket testing. This testing resulted in perchlorate contamination at Edwards. In addition to the plume at Site 285, perchlorate has been detected in groundwater at various other restoration sites on base.

All the perchlorate contamination at Edwards is found in shallow groundwater that already contains high levels of naturally occurring total dissolved solids. No drinking water sources are threatened.

The system will run long enough to evaluate the various aspects from treatment to regeneration to perchlorate destruction.

Capital costs were approximately $800,000 for installation of this site-specific treatment compound and components.

John Paul Woodley Jr., Assistant undersecretary of Defense for Environment, second from left, stopped at Edwards in August to learn how the base is dealing with perchlorate. Accompanying Woodley was Pentagon official Maureen Sullivan, as well as Clare Mendelsohn and Baha Zarah.

Treatment system overview

The selective ion exchange resin used in the treatability study works like a magnet. The magnet attracts or pulls out the perchlorate. When there's no more room on the surface of the magnet it needs to be cleaned.

Resin adsorption — the process of the magnet pulling out a contaminant — uses bead-like synthetic polymers that are insoluble but porous. These resin beads look like hard plastic balls about the size of a pinhead.The waste stream flows through the resin beds and the contaminant adsorbs onto the beads.

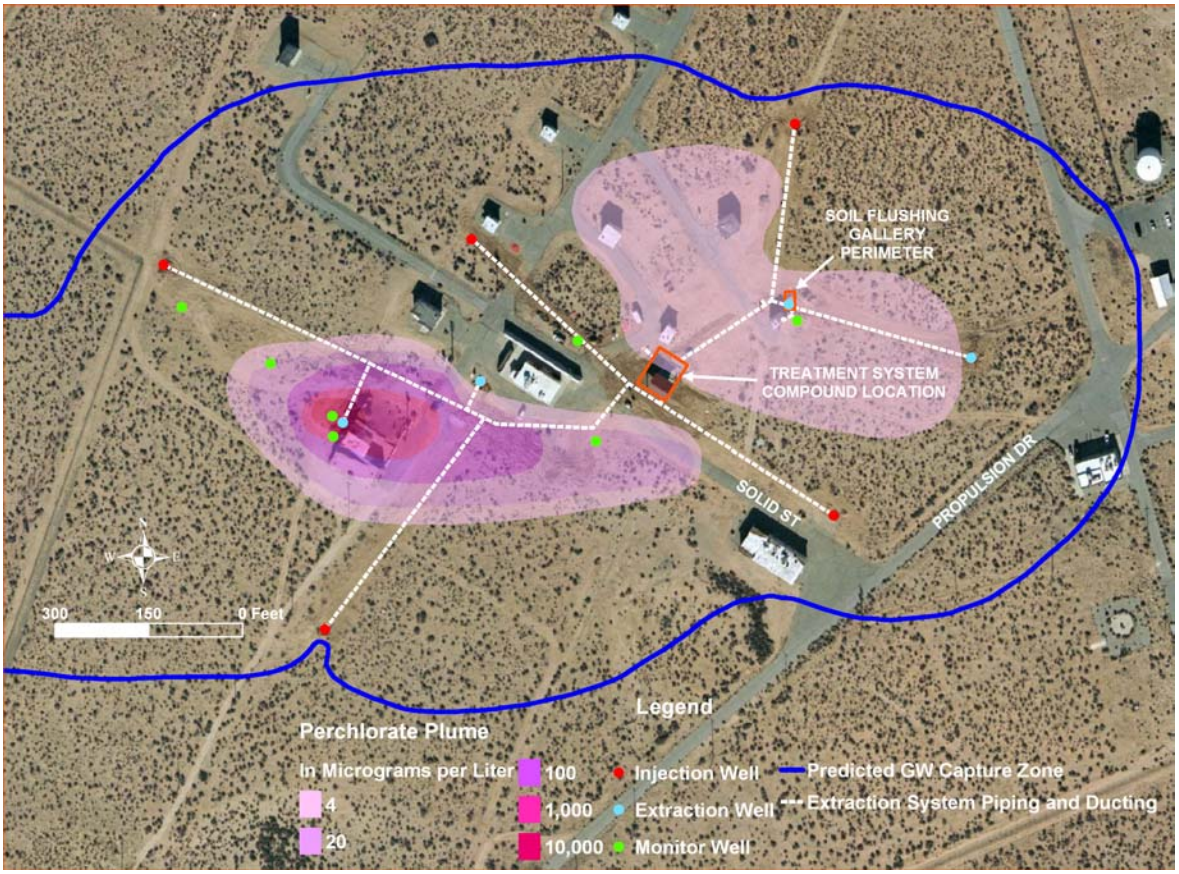
When a resin bed becomes saturated with perchlorate it must be regenerated. This is where perchlorate that attached to the surface of the resin beads is washed off to make the resin ready for reuse. The washing process uses a chemical solution to displace the perchlorate ions that are stuck to the exchange resin.

After regeneration, the regenerant solution will be stored onsite for subsequent use after perchlorate is destroyed from the solution. An innovative perchlorate destruction process unit is currently being designed and constructed and will be tested at Site 285 to evaluate its effectiveness in breaking down perchlorate in the regenerant solution into harmless byproducts of chloride and water.

Perchlorate treatment system facts and figures

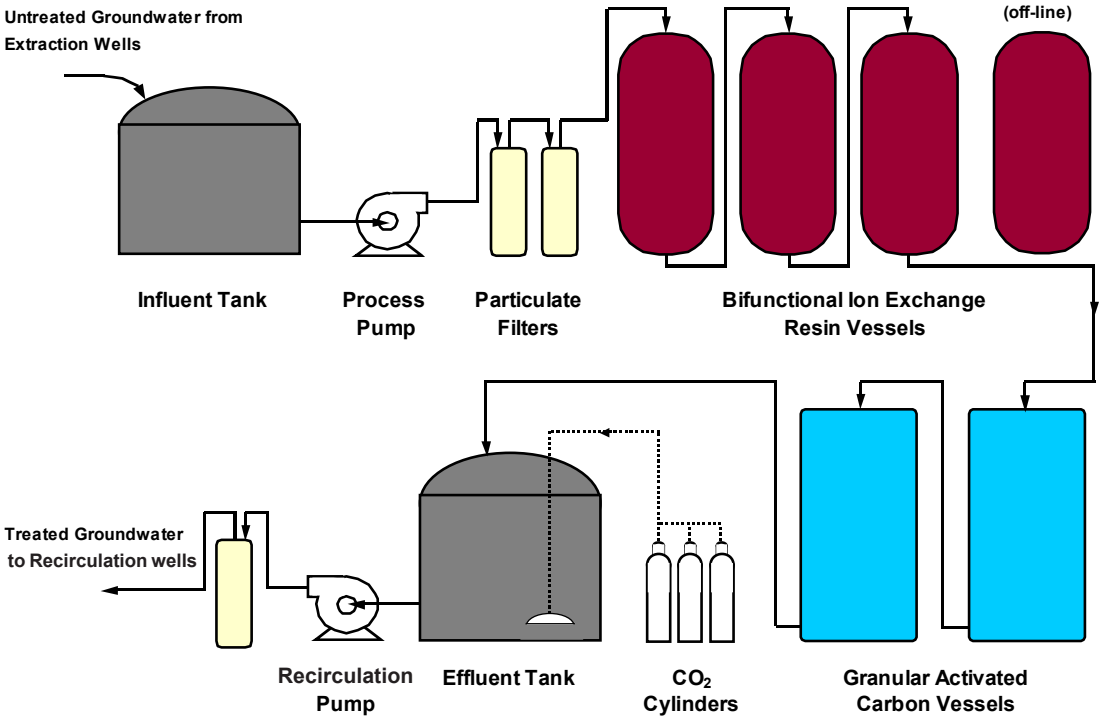
- Treatment began in May 2003
- 5.1 million gallons of groundwater treated
- Influent perchlorate concentration is 400 parts per billion
- Perchlorate continues to be removed to nondetectable levels
- 17.9 pounds of perchlorate removed
- Flowrate is 35 gallons per minute
- Regeneration of first resin vessel anticipated in December 2003
- Destruction of perchlorate from first regenerant solution batch anticipated in February 2004

Air Force Flight Test Center Environmental Public Affairs
5 East Popson Avenue Building 2650A Edwards AFB, California 93524-8060 (661) 277-1454



The diagram to the left shows the overlay of the Site 285 treatment system, piping, and wells with the groundwater perchlorate plume and site features. The blue line represents the predicted groundwater capture zone - which is created by the groundwater extraction and recirculation layout. Recirculating water back into the ground helps push the contaminated water to the extraction wells.

Process Flow Diagram
Site 285 Groundwater Extraction and Treatment System



For more information on this project or the Edwards' Environmental Restoration Program, contact Gary Hatch, chief, Environmental Public Affairs at (661) 277-1454 or email: gary.hatch@edwards.af.mil.